HARVEY/2

THE HARVEIAN ORATION,

DELIVERED BEFORE

THE ROYAL COLLEGE OF PHYSICIANS,

OCTOBER 18*th*, 1893.

BY

P. H. PYE-SMITH, M.D., F.R.S.,

Fellow of the College, and Physician to Guy's Hospital.

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THE HARVEIAN ORATION, 1893.

Mr. President, Fellows and Visitors,—

It is now 237 years since the illustrious Fellow of this College whose name we are met to commemorate, provided, when two years before his death he conveyed his estate at Burmarsh to the College, that:—

"There shall be once every year a general feast for all the Fellows; and on the day when such feast shall be kept, some one person of the said College shall be from time to time appointed by the President and two Eldest Censors and two Eldest Elects for the time being of the said College (so that the person so to be appointed be not in that behalf appointed two years together), who shall make an Oration publicly, in the said College, wherein shall be a commemoration of all the benefactors of the said College by name, and what in particular they have done for the benefit of the said College, with an

exhortation to others to imitate those benefactors, and to contribute their endeavours for the advancement of the Society, according to the example of those benefactors; and with an exhortation to the fellows and members of the said College to search and study out the Secrets of Nature by way of experiment; and also for the honour of the profession to continue in mutual love and affection among themselves, without which neither the dignity of the College can be preserved, nor yet particular men receive that benefit by their admission into the College which they might expect; ever remembering that '*concordiâ res parvæ crescunt, discordiâ magnæ dilabuntur.*' "

It will be seen from this quotation that there is no obligation on the Orator to commemorate Harvey alone, or at all, except as one of the many benefactors of the College; and inasmuch as the material benefits of the gifts conferred by Linacre and Caius, by Harvey and Hamey, and by the Founders of our College Lectures, are less valuable than the intellectual gifts which have led Fellows of the College since Harvey's time to search out "the secrets of Nature by way of experiment," and still less

valuable than the mutual respect and affection among ourselves, by which the honour of the profession has been advanced and the dignity of the College preserved—it would be in accordance with my duty to-day to recall to your memory the scientific achievements of Gilbert, of Glisson, or of Willis, of Jurin, of Thomas Young, of Wells, or of Prout, or the more strictly medical labours of Sydenham, or Heberden, or Bright. Nor less worthy of commemoration would be those Fellows who have dignified our community by their literary genius, as Arbuthnot ; or by their taste and munificence, as Mead ; or by the humanity and simplicity of their character, as Babbington, and Watson, and Parkes, and Wilson Fox.

The tradition, however, handed down for so many years seemed too strong to be broken, and I therefore invite you once more at this Harveian Festival to consider some aspects of the work of Harvey.

I. Concerning that immortal discovery, which places him in the limited class represented by Aristotle and Archimedes, Copernicus, Newton, and Darwin, it is difficult to say anything that has not been better said already, for again and again its originality and importance, the methods by which it was attained, the steps made by others which led up to it, and the effects which followed it, have been learnedly and eloquently expounded by my distinguished predecessors.

(*a*) To refute, however, all cavils against the priority of Harvey, and all attempts to transfer *his* laurels to the head of another, it is sufficient to bear in mind the following considerations:—

1st. If Harvey's doctrine of the circulation was not new, why was it opposed by men in the position of Riolanus and Hoffmann, and welcomed as a discovery by Bartolinus and Schlegel and

Descartes? Surely his contemporaries were better judges of the novelty of his views than we are!

2nd. Admitting that Servetus and Columbus taught the doctrine of the lesser circulation, we need but a moment's thought to convince us that no complete knowledge of this part of the subject was possible until the existence of a systemic circulation was established; for the one is physically impossible without the other.

3rd. The title of Harvey's great work is not, as it is sometimes quoted, "The Circulation of the Blood," but "*De Motu Cordis et Sanguinis.*" He first showed that the flesh, or parenchyma, of the heart is true muscle, that the heart is not a passive chamber receiving the blood, but a contractile organ expelling it. Until the motive power of the heart was understood there *could* be no true theory of the circulation.

The fact is, that when we know the true solution of a problem, it is easy to see or think we see it in any discussion which preceded the discovery; for there is only a limited number of answers to most questions, and therefore true as well as false solutions are almost sure to have been proposed.

In the writings of Columbus, Servetus, and Cæsalpinus, phrases occur which sometimes seem as if the writers were going to state the truth that Harvey first asserted.

But it would be as reasonable to infer, from such passages, that the circulation of the blood was then known, as from the lines that Shakespeare puts into the mouth of Brutus:

> "As dear to me as are the ruddy drops
> That visit my sad heart."

He only *discovers* who *proves*. To hit upon a true conjecture here and there amid a crowd

of untrue, and leave it again without appreciation of its importance, is the sign, not of intelligence, but of frivolity. We are told that of the Seven Wise Men of Greece, one (I believe it was Thales) taught that the Sun did not go round the Earth, but the Earth round the Sun, and hence it has been said that Thales anticipated Copernicus — a flagrant example of the fallacy in question. A crowd of idle philosophers, discussing all things in Heaven and Earth through the long summer days and balmy nights of Attica, must sometimes have hit on a true opinion, if only by accident; but Thales, or whoever broached the heliocentric dogma, had no reason for his belief, and showed himself not more, but less reasonable than his companions. The crude theories and gross absurdities of Phrenology are not in the least justified, or even excused, by our present knowledge of cerebral localization; nor do the baseless speculations

of Lamarck and Erasmus Darwin entitle them to be regarded as the forerunners of Erasmus Darwin's illustrious grandson. Cuvier was perfectly right in his controversy with Geoffroy St. Hilaire; the weight of evidence was undoubtedly on his side. Up to 1859 impartial and competent men were bound to disbelieve in Evolution; after that date, or at least so soon as the facts and arguments of Darwin* and Wallace had been published, they were equally bound to believe in it. He discovers who proves; and by this test Harvey is the sole and absolute discoverer of the movements of the heart and of the blood.

(*b*) Concerning the *methods* used by Harvey, they were various, and his discovery, like most great advances in knowledge, was not achieved by one of the happy accidents which figure in

* "The Variation of Animals and Plants under Domestication," was published in 1868.

story books, nor by the single crucial experiment, never in after ages except by special Certificate to be repeated, which some members of a certain Royal Commission supposed to be the only kind of experiment needed in scientific inquiries.

A perusal of Harvey's own statements makes it plain, it seems to me, that having gained his knowledge of the anatomy of the heart and of the current hypotheses of its function from his Italian masters, he reasoned thus:—First, that the cardiac valves must be intended for such physiological service as their construction would indicate. He believed that every part of this human microcosm has a meaning; that it is by no chance result of blind forces that an organ is adapted to its end. This great postulate is necessary for scientific progress. If the difficulties of physiology, whether normal or morbid, seem so intricate and insuperable that we are tempted to doubt whether the riddle after all

has an answer, we must again and again fall back on the faith of Harvey and of Newton, of Boyle and of Linnæus. The great doctrine of natural selection has thrown wonderful light upon the methods by which the results that we see have been reached, but has not impaired the excellence of those results nor their evidence of beneficent design. The application of scientific methods to the study, not only of man as an individual, but to the human race in its social aspects—the science of civilization in its ethical and political development — this *nova scientia* which was foreseen by Harvey's contemporary, Vico—has so enlarged our conceptions that we may invert the argument of the Roman Orator when he inferred Providence in human affairs from design in human structures:—

"Est, est profecto illa Vis; neque in his corporibus atque in hac imbecillitate nostra inest quiddam quod vigeat et sentiat, et non inest in hoc tanto naturæ tam præclaro motu." (*Cicero pro Milone.*)

Belief then that the body and all its parts is a machine constructed for certain uses, that everything in Nature has a reason and an end—this was Harvey's postulate when he argued out the functions of the heart and vessels from their anatomical construction.

Harvey's second method was that of actual experiment. On this point he leaves us in no doubt. His second chapter is headed, "*Ex vivorum dissectione qualis sit cordis motus*," and in the introductory chapter which precedes this, he says:—

"Tandem majori indies et disquisitione et diligentia usus, multa frequenter et varia animalia viva introspiciendo, multis observationibus collatis, et rem attigisse et ex hoc labyrintho me extricatum evasisse, simulque motum et usum cordis et arteriarum quæ desiderabam comperta habuere me existimabam."

Many of his vivisections were not strictly speaking experiments, but observations—inspection

of the living heart and arteries—others were experiments in the modern and restricted use of the word. These were Harvey's methods, as they must be the methods of all Natural Science. First, observation; next, reflection; then experiment. "Don't think; try," was Hunter's advice to Jenner; an advice that is often needed by an acute and speculative genius like his; still more often by sheer idleness, that will never bring its fancies to the test of fact.*

Experiments without hypotheses are often fruitless, but hypotheses which are never brought to the test of experiment are positively mischievous.

(c) How far have the Fellows of this College obeyed Harvey's precept and followed his example in "searching out the Secrets of Nature by way of experiment." We must, I fear, confess that

* Ea autem vera esse vel falsa, Sensus nos facere debet certiores, non Ratio; *αὐτοψία* non mentis agitatio.—Second Epistle to Riolanus, p. 133. (College edition.)

after the brilliant period of the 17th Century (in some respects the greatest of our history and certainly the most fruitful in great men) experimental science made slow and uncertain progress, so that between Harvey and Newton, Hook and Grew, Mayow and Boyle on the one hand, and Cavendish, Black and Priestley, Hunter and Hewson on the other, there was nearly a hundred years of stagnation or even retrogression. Hypotheses and dogmas, misapplied mathematics, imperfect chemistry, and an affected literary style (made more conventional by the practice of writing in a foreign language better fitted for rhetoric than science) contributed to make the 18th Century comparatively barren, in so far as science generally, and physiology and medicine in particular are concerned.

It is a remarkable fact that Dr. Gregory, of Edinburgh (1753-1821), in his once highly-valued "*Conspectus Medicinæ*," writes thus uncertainly of the lesion in Hemiplegia being on the opposite side to the paralysed limbs, a fact which had been well known to the ancients*:—

"Fertur, et sane plurimorum jam medicorum observationibus confirmatur, latus adversum ab eo in quo cerebri vitium est sic resolvi." (Chapter xii., section 382).

Heberden, it is true, contributed observations which were not unworthy of Sydenham or Hippocrates, but his work, like theirs, was purely clinical. It was not until the close of the Great War that scientific medicine made a fresh start. Its progress has since mainly depended upon the application of new methods of observation by the stethoscope, the test tube, the microscope, the clinical thermometer, and the ophthalmoscope.

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* Aretæus de Causis et signis morborum chronicorum.—Lib. I. cap. vii.

The "way of experiment," in the strict sense of the word, has been hitherto most successfully applied to normal physiology. The successors of Harvey were not Sydenham, Radcliffe, Arbuthnot, Garth, Meade, Freind and Heberden, but Lower, Mayow, Hales, Vierordt, Ludwig and Chauveau. *Pathology* as an experimental science is still in its infancy, but the infancy is that of Hercules, and bids fair to strangle such dire pests as anthrax, cholera, tetanus and hydrophobia.

(d) Before quitting this part of my subject, I would fain correct a popular misconception that Harvey was a neglected genius—that his contemporaries, his professional brethren, and in particular this ancient College, refused to listen to his new notions, ridiculed his discoveries, and spoiled his practice. Whether, as his fame grew his practice diminished, we cannot tell.* If so,

* Aubrey says so, but Aubrey was a gossip.

his patients were the losers. What Harvey and every honest man cares for, is not popular applause, but the confidence and esteem of his comrades; and this he deserved and received. It was as Lecturer at this College that he propounded his discoveries; it was here that he found his disciples and his friends; here he was urged to take the Presidential chair; and here his statue was erected, five years before his death, with the inscription, "*Viro monumentis suis immortali.*" It would have been a poor compliment to his elaborate demonstrations, and unworthy of a liberal profession, if so startling a revolution as Harvey proposed had been accepted without inquiry. It was considered, it was discussed, and, without haste but without timidity, it was at last accepted—the very way in which Darwin's theory was received and criticised, and adopted by Lyell and by Hooker. Let then no scientific

impostor or medical charlatan quote Harvey to console him under merited censure.

II. Of Harvey's writings, the second, and by far the longer treatise, is that upon Generation. This formed the subject of a valuable criticism in the Harveian Lecture by the late Sir Arthur Farre. It is full of interest and contains many valuable observations that remain true for all times, many acute criticisms, and a few broad and true generalizations, such as the famous dictum—"*Omnia animalia ex ovo progigni.*' Some passages show that Harvey was not without the faculty of humour, which, as Dr. Arnold remarked, few great men have lacked. Such is the account of the accomplished parrot who was Mrs. Harvey's pet, and through a long life maintained the masculine character, until in one unguarded moment she lost it and her life together.*

* A parrot, a handsome bird and a famous talker, had long been a pet of my wife's. He became so tame that he wandered freely through the house, called for his mistress when she was abroad, greeted her with

Perhaps, however, what most strikes the reader of this Treatise is the *learning* of the writer. He is familiar with his Aristotle, and quotes from Fabricius and other writers with much greater freedom than in the succinct and almost sententious treatise *de motu Cordis et sanguinis*. Some would have us believe that here, as in other cases, erudition was a clog upon genius. This question has been often discussed, and it has even been maintained that he is most likely to search out "the secrets of

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vociferous joy on her return, answered her questions, flew to her, and aiding himself with beak and claws climbed up her dress to her shoulder, whence he walked down her arm and sat upon her hand. When bidden to discourse or to sing he was always ready, even in the dark. He would seat himself in my wife's lap, and delight to be stroked and fondled, while a gentle movement of his wings and a soft murmur witnessed to the pleasure of his soul.

I always supposed he was a cock-bird, on account of the great excellence of his conversation and his singing.

At length, however, our parrot, who had lived many years in the enjoyment of excellent health, fell ill, and after a series of convulsive attacks, he, to our great sorrow, breathed out his life on his mistress's lap, where he had so often loved to lie.

On making a post-mortem examination, in order to ascertain the cause of death, I discovered an almost complete but unimpregnated and addled egg in the oviduct.—*De Generatione*, cap. v.

Nature by way of experiment," who comes fresh to the task with his faculties unexhausted by prolonged reading, and his judgment uninfluenced by the discoveries of others. This, however, is surely a delusion. Harvey could not have discovered the circulation of the blood had he not been taught all that was previously known of Anatomy. True, no progress can be made by mere assimilation of previous knowledge. There must be intelligent curiosity, an observant eye and intellectual insight;

"*Doctrina sed vim promovet insitam;*"

and few things are more deplorable than to see talent and industry occupied in fruitless researches, partially re-discovering what is already fully known, or stubbornly toiling along a road which has long ago been found to lead nowhither. We must then instruct our students to the utmost of our power. Whether they will add to knowledge we cannot tell, but at least they shall not hinder

its growth by their ignorance. The strong intellect will absorb and digest all that we put before it, and will be all the better fitted for independent research. The less powerful will at least be kept from false discoveries, and will form (what genius itself requires) a competent and appreciative audience. Even the dullest scholars will be respectable from their learning, and if they cannot make discoveries themselves, can at least enjoy the delight of intelligently admiring the discoveries of others.

III. There is, however, a third phase of Harvey's intellectual work, of which, unfortunately, the records have perished, and which has not, perhaps, been duly appreciated. I do not speak of his practice. A file of his "bills," however interesting to the antiquarian, would probably be of as little therapeutical value as those of his contemporaries. Diagnosis, in the modern

sense of the word, was scarcely thought of at that time, and treatment was either empirical or mischievous. What I believe Harvey contributed, or would, but for adverse fate, have contributed to Medicine as distinct from Physiology, was a systematic study of Morbid Anatomy. In the following passage he speaks of the great benefit that would ensue from the regular observation of the structural changes produced by disease:—

"Sicut enim sanorum et boni habitûs corporum dissectio plurimum ad philosophiam et rectam physiologiam facit, ita corporum morbosorum et cachecticorum inspectio potissimum ad pathologiam philosophicam. Quippe eorum, &c." (p. 92 of 4to. College Edition).*

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* In the same way that the dissection of healthy bodies is of the greatest importance for true scientific physiology, so the inspection of diseased bodies after death is no less necessary for scientific pathology.

For physiology is the study of natural conditions, and must first be studied by physicians, inasmuch as what is normal is healthy, and the rule for its own rightness, as well as for every abnormal deviation therefrom. But when deviations from health, or any abnormal conditions are defined by the light of healthy structures, then pathology, the science of disease, becomes intelligible. Then also from a knowledge of pathology the practice and art of healing, and numberless new methods of treatment, will naturally spring.

No one would easily believe how greatly the viscera are altered by disease, particularly in chronic cases, and how extraordinary the

Now this was a new notion. It was not uncommon for the body to be opened after death, especially in the case of great personages, either for the purpose of embalming or for discovering (as it was supposed) the fact of poison or other foul play; and occasionally a physician would obtain permission for a like inspection when something unusual in the symptoms had excited a laudable curiosity to ascertain their cause. But the records of such inspections in the 17th century by Bartolinus, or Tulpius, or Bonetus, or, in our own country, by Mayerne, or Bate, or Morton, are fragmentary, their object being limited to the individual case. There was no attempt to search out the secrets of Nature in disease by a systematic observation of the state of the organs after death, nor was there for more than a century

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anatomical effects of prolonged sickness often are. Indeed, I am confident that the opening and thorough inspection of one dead body, which has been wasted by slow disease or by infection, is of more real service to the art of healing than the dissection of ten corpses of healthy criminals.

after Harvey's death. Morgagni * in Italy; the French anatomists of the early part of this century, Corvisart and Laennec, Broussais and Cruveilhier; in Germany Meckel and Rokitansky, and in England Baillie, Abercrombie, Carswell and Bright—these were the founders of scientific Pathology on a sure anatomical basis almost within living memory.

Not only had Harvey the prescience to recommend the study of Morbid Anatomy for itself, but he had himself recorded a large number of dissections, or, as we should now call them, inspections, of diseased bodies. Unfortunately these post-mortem reports, with his observations on the generation of insects, and other manuscripts were destroyed, or irrevocably dispersed, when his house in London was searched while he was with the King at Oxford. If the records of these inspections had been published,

* John Baptist Morgagni died at Bologna in 1771, but his great work, *De sedibus et causis morborum*, was only published in 1780.

may we not assume that Harvey's great authority would have set the fashion, and that the systematic study of Morbid Anatomy would have begun a century and a half earlier than it did? And think what this would have meant. With the exception of a few shrewd observations, a few admirable descriptions, and here and there a brilliant discovery, such as the origin and prevention of lead colic and of scurvy and the introduction of vaccination, it may be said that Medicine made no important progress between the time of Harvey and that of Laennec. The very notion of Diagnosis in our modern sense of the word depends upon Morbid Anatomy. The older physicians seldom attempted to determine the seat of an ailment.* Disease was looked upon not as a condition depending

* I have been told by a contemporary of an eminent physician in this city that the accuracy of his diagnosis (it was before the introduction of the stethoscope) was remarkable, for he rarely failed to fix the seat of a disease in that one of the three great cavities of the body in which it was found after death.

upon disordered physiological functions, but as something external, attacking a previously healthy person, disturbing, and, if not expelled by art, finally destroying him; while any structural changes which were found after death were regarded rather as the effects than the causes of the symptoms during life.

Now, the ambition of every intelligent student ---and in Medicine we are life-long students—is to fix upon the most objective, certain, and important of the symptoms of a patient, to follow out this clue, to determine the organ affected and the nature of the affection, so that in his mind's eye the tissues become transparent and he sees the narrow orifice for the blood-stream and the labouring muscle behind it; or the constricted loop of intestine with violent peristalsis above and paralysis below, the blood-current stopped and congestion passing hour by hour into gangrene; or, the spinal cord with grey induration of a definite

region, and the motor, sensory and trophic changes which physiologically ensue.

Sometimes this minute search to fix upon the locality and exact nature of a lesion has been ridiculed; and we are asked what benefit to the patient such knowledge when attained can bring. We answer, that in Medicine, as in every other practical art, progress depends upon knowledge, and knowledge must be pursued for its own sake, without continually looking about for its practical application.

Harvey's great discovery (which we Physicians rightly celebrate this day) was a strictly *physiological* discovery, and had little influence upon the healing art until the invention of auscultation. So also Dubois Reymond's investigation of the electrical properties of muscle and nerve was purely scientific, but we use the results thus obtained every day in the diagnosis of disease, in

its successful treatment, and in the scarcely less important demonstration of the falsehoods by which the name of electricity is misused for purposes of gain.

It is true that Bernard's discoveries of the diabetic puncture and of the digestive function of the pancreas have not yet received their practical application. He was right when he said, "*Nous venons les mains vides, mais la bouche pleine d'espérances légitimes,*" but he should have spoken for himself alone.

The experiments on blood-pressure begun by Hales, and carried to a successful issue in our own time by Ludwig, *have* led to knowledge which we use every day by the bed-side, and which only needs the discovery of a better method of measuring blood-pressure during life, to become one of our foremost and most practical aids in treatment.

Again, we can most of us remember using very imperfect physiological knowledge to fix, more or less successfully, the locality of an organic lesion in the brain. I also remember such attempts being described as a mere scientific game, which could only be won after the player was beaten, since when the accuracy of diagnosis was established, its object was already lost; but who would say this now, when purely physiological research and purely diagnostic success have led to one of the most brilliant achievements of practical Medicine, the operative treatment of organic diseases of the brain?

Morbid Anatomy not only teaches us what lesions we have to discover, but also their true pathological relation. We learn that every disease does not affect every part of the body. If we make a horizontal list of all the organs and tissues, and a vertical one of all the known morbid changes, according to Rokitansky's laborious and

thorough-going method, we find the table almost useless, since the blanks are more numerous than the entries. If the liver, for example, were the possible seat of every tumour described in our college nomenclature of disease, it would be hopeless to attempt the diagnosis of an hepatic growth; if the small intestine were subject to every morbid change which can affect a mucous membrane, we should be lost amid such a crowd of possibilities. But Morbid Anatomy teaches us that each organ has its peculiar liabilities to disease, so that when we have determined the *seat* of a malady we have gone far towards establishing its *nature*. Moreover, such concomitant variations as hypertrophied left ventricle, and granular kidneys, basal meningitis and caseous lymph glands, visceral abscess and ulceration of the cardiac valves teach us much more than anatomy or diagnosis. They throw a clear light

upon the nature and the origin of diseases, and hence upon their prevention and cure.*

True, there are functional disorders and others which are toxic or parasitic; but it is the object of the study of Morbid Anatomy to limit, and, as nearly as may be, to abolish the former group by tracing disordered functions to structural changes or to poisonous or parasitic influences. We may measure the progress of medical science during the present century by the fact that Fever, Dropsy, Paralysis and Apoplexy are for us no longer *diseases* but only *symptoms* which leave us unsatisfied till we have traced them to their origin.

It has often been questioned whether the study of Morbid Anatomy has not withdrawn attention from Morbid Physiology; and, again, whether the time employed upon pathological

* See Dr. Wilks's article in Guy's Hospital Reports for 1865 (3rd series, Vol. xi., p. 1).

researches would not have been better spent in directly therapeutical inquiry. To both these questions I take leave to answer, No. Anatomy must precede Physiology, whether in the normal or the diseased state. The humoral physiology of the ancients did infinite mischief (mischief not yet exhausted), because it lacked the sound basis of Anatomy; and Experimental Pathology, necessary and important as it is, and valuable as even its first endeavours have proved, was impossible without previous knowledge of the anatomy and histology of disease. As to Therapeutics, while professing full faith in the ultimate value of such laborious chemical and physiological researches of the laboratory as those which were the subject of the recent Croonian Lectures, I hold that for the successful cure of a patient it is far better that his physician should have a thorough and extensive knowledge of Morbid Anatomy, than that he should be acquainted

with all the baths and waters, the hotels and lodging-houses throughout the world, or familiar with the barbarous names and pretended virtues of all the advertised nostrums that deface the fair English fields from London to Oxford. The public suppose that it is *their* business to know what is the matter, and the doctor's to find the remedy; if so, our art would be confined to learning the name of the patient's disorder by letter, post-card, or telegram, and looking up in an index of remedies the twenty or thirty drugs which are "good" for that particular complaint. *We* know that the real difficulty is to ascertain the nature and origin of our patient's disorder; when that is done, the treatment in most cases is obvious, and in many effectual; when it is not done, our treatment is vacillating, and either futile or mischievous. We have already ample means at our disposal for influencing almost every organ of the body. A

new tool is occasionally offered us which deserves proving, but what we want far more is knowledge how to use the tools that we have. Treatment without diagnosis, besides its inefficiency, brings us for the time unpleasantly near to the charlatan who, whatever title he may assume, is always therapeutical and never pathological. Rational, bold, and effectual treatment, whether preventive or curative, must always depend upon accurate diagnosis and sound pathology, and the power of diagnosis depends upon that systematic inspection of the bodies of diseased persons which was recommended and practised by Harvey.

"Ad hanc inspectionem, cum Heraclito apud Aristotelem, in casam furnariam (sic dicam) introire si vultis, accedite: nam neque hic Dii desunt immortales. Maximusque omnipotens Pater in minimis et conspectior vilioribus quandoque est."

Suffer me, then, Mr. President and Fellows of this College, to obey the instructions of the founder of this Lecture, by exhorting my hearers, and

especially those Fellows who are junior to myself, to emulate, according to the varied talents entrusted to each, the example of Harvey in these three particulars :—

(i.) In investigation by experiment, whether in Pathology or Physiology.

We have now difficulties unknown to Harvey in carrying out this duty, for duty it certainly is, incumbent upon all who have the opportunity and the necessary training. The countless experiments on living animals which were carried out during the 17th century in all civilised countries —in Italy, Holland, Denmark, France, Germany, and England—bore a rich fruit of physiological knowledge. If the anatomy of the human body was thoroughly ascertained by the great men of the 16th century, by Vesalius, Sylvius, and their successors, it is no less true that to the 17th century is due the discovery of the elements of

physiology. The action of the heart and the circulation of the blood, the absorption of chyle by the lacteals and thoracic duct, the mechanism of respiration and some knowledge of its chemical effects, the function of secretion by glands, the minute structure of the eye and ear, and of the reproductive apparatus, and a knowledge—imperfect, but true as far as it went—of the functions of the brain and nerves, these were the achievements of the 17th century due to Harvey, Glisson, Willis, and Mayow, among our own countrymen, and to Pecquet, Malpighi, Leuwenhoeck, De Graaf, Swammerdam, Aselli, Redi, and Bartolinus. In all this brilliant advance of knowledge, experiment upon the lower animals was the method used, and the method is as indispensable now.

Anyone conversant with a single branch of Natural Science is aware that experiment, as well as observation, is necessary. Who would expect

discoveries in physics, or in chemistry, without laboratories and experiments? Do not botanists investigate the functions of plants by dissection, by microscopic and chemical investigation, and by *experiment*? Have we not this very year celebrated the important results of fifty years' *experimental* researches into the life and growth of plants by Lawes and Gilbert? And is it not obvious that the same necessary well-tried and indispensable method of inquiry must be continued in the case of animals? Happily the same experimental science has discovered the means of abolishing the tribute of suffering which the brute creation paid in the hands of Harvey and Hales, of Haller, Magendie, and Sir Charles Bell. By means of chloroform and other anæsthetics, and by means of the antiseptic methods which we owe to Sir Joseph Lister, the subjects of experiment are spared the pain and shock of an operation, and the pain

which used to follow an operation. In fact, almost the only experiments upon the lower animals which involve distress are those which are most immediately and directly useful to ourselves and to them; inoculations, namely, with a view to reproduce diseases, and the direct therapeutical testing of drugs. Cruelty is utterly repugnant to our calling; and it seems absurd that men, who will with just confidence entrust themselves and the lives of those nearest to them to our protection and care, should yet so far distrust us as to shackle attempts to improve our knowledge and our power by cumbersome and ridiculous restrictions. Let us hope that on the one hand increasing humanity and gentler manners will extend compassion for the lowest of God's creatures from the educated classes of England and America until it permeates all ranks and all nations; and that on the other full liberty will be given

to the prosecution of researches, laborious and thankless in themselves, but of the utmost value for the relief and prevention of disease in man and brute alike. May I also express a hope that those who administer our laws will take heart of grace, and in this, as in other matters, try whether Englishmen do not prefer the conscientious maintenance of a Statesman's own judgment before a time-serving submission to ignorant clamour.

(ii.) In the second place, I would exhort my brethren, and especially the Members of this College, to cultivate Learning. Harvey went to study in Italy, then the nursery of science as well as of art, and he was familiar with the writings of Plato and Aristotle and Virgil, as well as with those of his immediate predecessors, Fabricius and Columbus. So in that golden time which comes to most of us, between taking the Academical Degree and becoming immersed in

the daily duties of Hospital life, I strongly advise a visit to one of the German Universities, or to Paris, to acquire the key to the two languages in which the best modern books are written; and to widen the mind by seeing the aspect of science and affairs from a Continental standpoint. It is lamentable that there is so little professional intercourse between the students of one of our London Schools and the teachers of another. The laudable energy which has made each of them complete, and well-equipped Colleges has had this drawback, that at the present day the attention of a diligent student is more confined to the teaching and practice of his own school than it was sixty or seventy years ago.* The narrowness and prejudice bred by this isolation may be corrected by a visit to the

* Let us hope that the University of London when reconstituted by the labours of the Royal Commission, which is now preparing its Report to the Crown, may provide by the Regulations of its Medical Faculty for more community of teaching and learning among students of medicine in this city.

famous sister Universities of Edinburgh or Dublin; for their complete removal no prescription is so efficient as a prolonged stay in Continental laboratories and hospitals. But even such a broad and liberal education, even familiarity with the daily advances of medical science recorded in periodicals and archives and year-books, or transmitted by telegraph to the wondering readers of the daily newspapers, is not all that is needful to make a learned Physician. We know well the difference between reading of an experiment, or even seeing it performed, and doing it with our own hands. We know the difference between studying a pathological atlas, or even a cabinet of histological slides, and seeing and handling morbid tissues and making sections for ourselves. So also is there all the difference between learning the present conclusions as they stand recorded in the last edition of a text-book or compendium

and tracing the steps by which our present knowledge has been reached.

With regard, for instance, to the physiology of the circulation, it is not only curious but instructive to follow its gradual growth from Galen and Vesalius, Columbus, Cæsalpinus and Servetus, to Harvey and Lower and Malpighi, to Hales and Vierordt, to Ludwig, to Chauveau and Marey, to Gaskell, and Roy. The only true scientific method is the historical one. If we only know the results of a science without the steps by which they have been reached, we have indeed its practical use, but lose half its educational value. We are almost in the position of an engineer who knows the conclusions of trigonometry by rote, but is ignorant of the demonstration. I would therefore urge upon Junior Fellows, while still enjoying the prospect rather than the fruition of professional success, to spare some of the time which is unoccupied by work in

wards and laboratories for the perusal of such antiquated works as have been published as much as twenty years ago, and particularly for gaining acquaintance at first hand with Virchow's Cellular Pathology, and the Lectures of Watson, Trousseau and Stokes; or, if their time and inclination does not allow of more extended research, at least to read such succinct masterpieces as Laennec's Mediate Auscultation, Heberden's Commentaries, Sydenham's Treatise on Gout, and Harvey on the Movement of the Heart and of the Blood.

(iii.) I would, moreover, exhort Fellows of the College to see that, while all the new methods of Experimental Pathology and of Pharmacology are carried out by duly trained physiologists, we do not neglect the fundamental method taught and practised by Harvey of inspecting the bodies of those who have died of disease. It was this union of Morbid Anatomy with Clinical Observation which

made the discoveries of Laennec and of Bright really fruitful. Without these autopsies, clinical medicine is but an empirical art, diagnosis a sham, and treatment little better than quackery. Exclusive attention to Therapeutics is apt to bring a man dangerously near to Homœopathy and other pretended Systems of treatment, but sound pathology, and diagnosis controlled by post-mortem inspection, give positive knowledge and that union of modest self-confidence and prudent enterprise which become the physician.

Lastly. I have to fulfil the duty of exhorting the Fellows of this ancient College "to continue in mutual love and affection;" and this is the easiest task of all. For, if we must admit that Experimental Science in England, and particularly Scientific Pathology, is not surpassing our byegone achievements as it ought to surpass them, considering the increased number of competent labourers and the vastly improved methods

of research; and if we admit that the crowd of modern literature and the distractions which we fondly imagine to be peculiar to our generation leave small opportunity for the extension and cultivation of ancient learning; and if the fascination of Pharmacology and Therapeutics and the prejudices of our patients, both gentle and simple, still make post-mortem inspections less common and systematic than they should be—whatever, I say, may be our shortcomings in these or in other respects—your Harveian Orator may most honestly congratulate the College and the profession upon the concord and mutual esteem which has happily marked our history from the days of Linacre to those of Harvey, from the days of Arbuthnot and Garth to those of Mead and Freind, from the days of Fothergill and Heberden to those of Matthew Baillie, of Babington and of Sir Thomas Watson. Nor is it here alone that we may congratulate ourselves upon the

liberal and cordial feelings which happily prevail. The same may, I believe, be said of our sister college, with which we are so happily united, not only in the necessary duties of examination, but in the nobler union of joint endeavours to search out the secrets of Nature by way of experiment. Long may this continue, for upon its continuance rests not only the dignity and peace of our profession, but in great measure our power of doing good. However ignorantly our patients will sometimes decry what they call professional etiquette, the wiser among them know (and in the long run the wise lead the foolish) that this term really means the observance of those rules which distinguish a profession from a trade, which make our calling honourable as well as honest, which check the arts of advertisement and direct our ambitions to obtaining the suffrages, not of the public which *cannot*, but of our profession which *can*, judge truly — rules of

conduct which are, in fact, nothing but the carrying into daily practice of the golden rule to do to others as we would they should do to us. For maintaining and strengthening this spirit of concord and good feeling, we depend upon each one of our Fellows, but especially on the example and authority of our Head — an example and authority which, as the College well knows, are worthily maintained by the untiring devotion to its best interests of our honoured President.